CAR WASH BLOWER CONTROL

CROSS-REFERENCES TO RELATED APPLICATIONS

[0001] This application claims the benefit of provisional application 60/477,550 filed 06/11/2003.

BACKGROUND OF THE INVENTION

1. Field of the Invention

[0002] The subject invention relates to an assembly for blowing liquids from the surface of a vehicle in a car wash.

2. Description of the Related Art

[0003] Assemblies for blowing liquids from a vehicle are well know and typically include a plenum for distributing air to a plurality of nozzles that direct air from the plenum toward a vehicle. The plenum is supplied air by a blower system having an inlet for sucking air in and an outlet for supplying pressurized air to the plenum for distribution to the nozzles. Such blowers include an impeller that is rotated in a housing by an electric motor, the impeller acting as a pump or compressor to pressurize air and force it into the plenum system.

[0004] There are significant periods during the operation of a car wash that there is no demand for blowing liquid from a vehicle, i.e., periods without a vehicle passing through the car wash. It is generally very detrimental to an electric motor to start and stop the motor. It is much more efficient in electrical power usage and maintenance of the electric motor to run the motor continuously. This problem

has been approached by controlling the delivery of pressurized air from the blower impeller by controlling the flow of pressurized air in the outlet from the impeller, as disclosed in U.S. Patent 4,836,467 to Rodgers. However, during the idle periods of no demand, the motor and impeller remain under load, and sometimes an increased load because of backpressure.

BRIEF SUMMARY OF THE INVENTION AND ADVANTAGES

[0005] The subject invention provides an improved blower control in an assembly for blowing liquids from a vehicle of the type including a plenum for distributing air to at least one nozzle for directing air from the plenum toward a vehicle with a blower system having an inlet for sucking in air and an outlet for supplying pressurized air to the plenum for distribution to the nozzle. The assembly is characterized by a valve mechanism disposed over the inlet for controlling the amount of air sucked into the inlet.

[0006] Accordingly, the subject invention allows the electric motor to be run continuously but without a load as air is unavailable through the inlet to compress or pump. Without a load, the motor uses less electrical energy and is subject to less wear and tear, thereby reducing maintenance.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0007] Other advantages of the present invention will be readily appreciated as the same becomes better understood by reference to the following

detailed description when considered in connection with the accompanying drawings wherein:

[0008] Figure 1 is a frontal view of a typical car wash water removal system with which the subject invention may be used;

[0009] Figure 2 is a top view of the system shown in Figure 1;

[0010] Figure 3 is an end view of the blower assembly of the subject invention;

[0011] Figure 4 is a top view of Figure 3;

[0012] Figure 5 is a side view of Figure 3;

[0013] Figure 6 is a perspective view of the valve mechanism of the subject invention in the open position;

[0014] Figure 7 is a perspective view of the valve mechanism of the subject invention in the closed position;

[0015] Figure 8 is an exploded perspective view of the valve mechanism of the subject invention; and

[0016] Figure 9 is a schematic view of the actuator and control valve for controlling the valve mechanism of the subject invention.

DETAILED DESCRIPTION OF THE INVENTION

[0017] Referring to the Figures, wherein like numerals indicate like parts throughout the several views, an assembly for blowing liquids from a vehicle is generally shown at **10**.

[0018] The assembly comprises a support plenum **12** for distributing air. A nozzle system is generally indicated at **14** and includes a nozzle **16** for directing air toward the top of a vehicle. The nozzle **16** comprises a flexible material, such as a fabric as is well known in the art. In addition, the assembly includes side nozzles systems, generally shown at **18** for directing air from the side legs of the plenum **12**, as is well known and shown in the aforementioned U.S. patent 5,960,564.

[0019] As more specifically described in application Serial Number 09/849,165 filed 05/04/2001, an air delivery conduit, including a plurality of pairs of telescoping tubes **20** and **22**, interconnects the plenum **12** and the nozzle system **14** for delivering air from the plenum **12** to the nozzle system **14** while allowing the nozzle system **14** to move in an adjustment direction toward and away from the plenum **12** between various vertical operating positions. The telescoping tubes **20** and **22** include a base tube **20** extending from the support plenum **12** and a movable tube **22** in telescoping relationship with the base tube **20** and attached to the nozzle system **14**. The tubes **20** and **22** are rigid and self-supporting and may be made of various materials such as metal or plastic. The tubes **20** and **22** are circular in cross section, as shown in phantom in Figure 2, and have a close or airtight fit. There may be a sliding seal incorporated between the tubes **20** and **22** to effect an air tight seal to prevent the leakage of air as the movable tubes **22** are moved into and out of the fixed or base tubes **20**. The base tubes **20** are welded or otherwise fastened to the support plenum **12**.

[0020] The nozzle system **14** is elongated and includes a fixed outer and upper shell **24** and a movable lower or inner shell (not shown) movably supported

by the fixed shell **24**. The movable tubes **22** are attached to the fixed shell **24** by welding or fasteners. The inner or movable shell is rotatably supported within the fixed shell **24** as the fixed shell **24** has an elongated opening along the bottom for the passage of air into the nozzle **16** and the movable shell has an elongated opening along the top to accommodate the rotational movement of the movable shell about a nozzle axis which is at the center of the circular shells.

[0021] The nozzle system **14** is suspended by bungee chords **32** which are attached to a cross bar **34**, the cross bar **34** supporting the fixed shell **24**. The bungee chords **32** extend upwardly to an upper end **38** secured to the plenum **12** and act as a spring to react between that upper end **38** and the cross bar **34** to lift the nozzle system **14** in the event of loss of power, or the like.

[0022] An actuator in the form of a pneumatic cylinder **42** is included for moving the nozzle system **14** between the operating positions whereby the nozzle system **14** may be moved up and down to accommodate the changing longitudinal configuration of a vehicle. The piston of the pneumatic cylinder **42** is attached to the cross bar **34** to move the nozzle system **14** up and down between raised and lowered operating positions. The bungee chords **32** act as a biasing system for automatically retracting the nozzle system **14** toward the raised operating position in response to loss of control by the actuator **42**.

[0023] The assembly also includes a rotary drive for rotating the nozzle **16** about the nozzle axis extending transversely to the adjustment direction and the nozzle **16** whereby the nozzle system **14** may be rotated about the nozzle axis to efficiently direct air against the contour of the vehicle.

[0024] The assembly **10** also includes a blower system, generally shown at **40**, having an inlet **44** for sucking in air and an outlet **46** for supplying pressurized air to the plenum **12** for distribution to the nozzles **16** and **18**. The blower system **40** includes a housing **48** surrounding an impeller and an electric motor **49** for rotating the impeller, as well known in the art. As illustrated, a blower system **40** is disposed on each side of the assembly with the blower system on opposite sides extending axially of the system **10** in opposite directions, but they may extend in the same direction, i.e., be mirror images of one another.

[0025] The invention is characterized by a valve mechanism, generally indicated at **50,** disposed over the inlet **44** for controlling the amount of air sucked into the inlet **44**.

[0026] It is to be understood that the subject valve mechanism **50** can be used to control pressurized air to various different blower systems and that the blower system described above is but exemplary of the environment in which the invention has utility. A more preferred embodiment of the above described blower system is set forth in U.S. Patent application Serial Number 10/280,914 filed 10/25/2002, now U.S. Patent 6,xxx,xxx granted in the name of the inventor herein. Additional blower systems in which the instant invention has utility are described in U. S. Patents 5,421,102 and 5,901,461.

[0027] Accordingly, the subject invention in the valve mechanism **50** is applicable to any blower system in an assembly for blowing liquids from a vehicle comprising a plenum for distributing air and at least one nozzle for directing air from the plenum toward a vehicle.

[0028] The valve mechanism **50** includes a frame **52** and a valve plate **54** slidably supported by the frame **52** for movement between open and closed positions, as shown in Figures 6 and 7 respectively. The frame **52** includes at least one and preferably two rails **56** and the valve plate **54** includes at least one and preferably four rail couplings **58** for engaging and sliding along the rails **56**. Each rail coupling **58** is defined by a sleeve presenting a circular bore surrounding a circular rod defining each rail **56**. A bushing may be disposed within the bore of each coupling **58** to act as a bearing against the rail **56**. A plurality of fasteners in the form of bolts and nuts attach the couplings **58** to the valve plate **54**. The bottoms and tops of the rods defining the rails **56** are attached to the frame **52** by stanchions **60**.

[0029] The valve mechanism **50** includes a pneumatic actuator **62** supported by the frame **52** for sliding the valve plate **54** rectilinearly along the rails **56** between the open and closed positions.

[0030] An inlet collar **64** is supported by the frame **52** and adapted for attachment to the inlet **44**. The frame **52** defines a rectangle having long sides adjacent the sides of the collar **64** and one short side defining a bottom close adjacent the collar **64** and one short side defining a top spaced from the collar **64**. The rails **56** extend between the top and bottom of the rectangle defining the frame **52** and the actuator **62** extends between the top of the rectangle defining the frame **52** and the valve plate **54**. The frame is made up of channel members having inwardly directed flanges that define an axial thickness and the valve plate **54** is disposed in that thickness, i.e., between the axial extremes or faces of the frame **52**. Sheets or panels **66** close these opposite faces of the frame **52** and a collar extension **68** extends

through the panel **66** on the inlet side or face of the frame **52**. Consequently, the valve plate **54** moves up and down in a closed space within a housing defined by the frame **52** and sheets **66**. The collar **64** is circular in cross section and extends axially from between the sides of the frame **52** and struts **70** extend between the top of the frame **52** and the collar **64** to act structural reinforcements for supporting the collar **64**. As alluded to above, the axially spaced panels **66** surround the collar **64** and collar extension **68** by extending to and closing the frame **52**.

[0031] The pneumatic actuator **62** is shown schematically in Figure 9 wherein a control valve **72** controls the flow of air to the pneumatic actuator **62** to raise and lower the valve plate **54**. The control valve **72** is appropriately controlled by a centralized central processing unit that determines the demand for airflow through the blower assembly **10**.

[0032] Obviously, many modifications and variations of the present invention are possible in light of the above teachings. The invention may be practiced otherwise than as specifically described within the scope of the appended claims, wherein that which is prior art is antecedent to the novelty set forth in the "characterized by" clause. The novelty is meant to be particularly and distinctly recited in the "characterized by" clause whereas the antecedent recitations merely set forth the old and well-known combination in which the invention resides. These antecedent recitations should be interpreted to cover any combination in which the inventive novelty exercises its utility. In addition, the reference numerals in the claims are merely for convenience and are not to be read in any way as limiting.